

Pest and Pest Management

Pest

Any biological object that causes economic damage that is called pest.

Forms of plant and animal life when they exist under circumstances that make them injurious to plants, men, domestic animals or other articles or substances. pest is generally considered to include those organisms which come into conflict with men, competition for his crops and livestock affect his health or comfort and destroy his property.

E.g. Insects, mites, rodents, bacteria, fungi, nematode etc.

Pest Management

Pest management is the intelligence of selection and use of pest control action that will ensure favourable economic, ecological and sociological consequence. pest control action include the monitoring of pest increases, judicious use of pesticides for the effective communication that no action is necessary.

Pest management deals with all available techniques which are evaluated considerably into a unified program to manage pest population, so that economic loss can be avoided and adverse side effect on the environment are minimized.

Pest management concept defect a tolerant approach to a pest status. The practise of pest management determines how the leaf system a pest needs to be modified to reduce its members to tolerate levels that is below the economic threshold level.

Economic Threshold Level (ETL)

ETL may be defined as the pest density at which no control measure should be applied to prevent and increasing pest population from reaching the injury level. The economic threshold always represent a pest density lower than that of economic injury level to the initiation of control measures, so that they can take effect before the pest density exceeds the economic injury level.

Economic Injury Level (EIL)

Various definition have been proposed for EIL.

It may be defined as the lowest pest population density that will cause economic damage or the level at which damage can no longer be tolerated and the level before which it is desirable to initiate deliberate control activities. At this level, the pest population that produces incremental damage equals to the cost of preventing the damage.

Equilibrium Position (EP)

It is that level of pest population before the ETL, which actually requires no control measure for the pest density. It is an average pest population density of an insect for a long period of time, unaffected by the temporary intervention of pest control. The population density fluctuate about this mean level as a result of the influence of density dependent factors such as parasites, predators and disease.

Agro-Ecosystem

Individual organism of the same species live together as a population. Population of different species live together and form a community and the community is influenced by its physical environment. We called such a complex system biotic and abiotic factors as ecosystem. So ecosystem are self sufficient habitats where living organism and the non-living environment interact to exchange energy and matter in a continuing cycle. Ecosystem are entities, such as forests, pond, crop fields and in general they are self regulating.

Ecosystem in relation to agriculture is called agro ecosystem.

Pest of Vegetables

Epilachna beetle

Scientific name : *Epilachna dodicastigma*

Family:Coccinelliadae

Order:Coleoptera

This is one of the major pest for vegetable crops in Bangladesh causing considerable damage to brinjal, tomato, potato, bean and cucurbitaceous vegetables.

Nature of damage

The beetles as well as grubs cause damage by feeding upon the epidermis of leaf tissues leaving parallel band of uneaten tissues between the leaves.Thus present a tube like appearance.They turn brown, dry up and fall of completely defoliating of the plant.

Life History

1. Eggs are laid in batches on the dorsal surface of the leaves.
2. Incubation period 4-6 Summer and 9-10 in winter.
3. There larvael stages in up to 2 weeks, pupal stages in 1 week.
4. Longivity of the beetles more than one month, the pest has 4-5 generation in a year.

Control Measure

Non-chemical control-

- Collection and destruction of egg masses or nuly has larvae along with leaves.
- Clean cultivation, crop rotation should be followed and destruction of stubbles from the field.

Chemical control-

- The infested plant/fields may be spraying with **Diazinon/sabion/Dizinol 60 EC**.
- Spraying with **malathion/zithiol/maladon/Fyfanon**.

Biological control-

Resistant variety should be cultivated.

Potato Tuber Moth

Scientific name: *Gnorimoschema operaculella*.

Order: lepidoptera.

Family: Gelechidae.

This is cosmopolitan in distribution and is a notorious pest of potato.

Life History:

1. The insect is small in size and active at night. It lays about 100-150 eggs in or around the eyes or cracks or on skin of exposed tuber.
2. The incubation period is 3-6 days.
3. The larvae become full grown in 15-16 days and yellowish with a brown head.
4. In pupates in a silken cocoon. The adult moth emerges in a week.
5. Life cycle complete in about 4-5 weeks.
6. There are 8-9 generations during a storage season.

Nature of Damage:

The insect occasionally infests potato crop in the field but is particularly serious in storage. In the field the larvae mine into the leaves or bore into petiole, terminal shoots and developing tubers underground during November to March and attack the tubers in storage from April to November. The infestation in storage may range from 30-70%. Tubers of potatoes are bored by caterpillars when cut and open the tunnels are found made by them.

Control Measure:

Non-chemical control-

- i) The potato should be well cultivated and deeply hilled.
- ii) After each irrigation, earthing up soil to be done.
- iii) The harvested tuber must be removed from the field immediately and should not be allowed to remain overnight in the field in exposed condition as moths may lay eggs on potato.

Chemical control-

- i) During planting tubers in the trenches **Diazinon/Basudin 10g @6.88 kg/acre** may be used.
- ii) Periodical spraying with **Sumithion/Edfen/Fentox 50 EC @ 454ml/acre** may be done in the field.
- iii) Tubers for seed can be protected from dusting, the bags with **Sevin 85 WP 10% dust**.

Brinjal fruit and Shoot borer

Scientific name: *Levinodes arbonalis*.

Family: Lepidoptera.

Order: Pyralidae.

Life History

1. The moths are white with small black spots on dorsal surface. Female moth lays eggs singly or in batches on flower shoots, buds and on the under surface of leaf.
2. Eggs are creamy white and hatch in 7-10 days.

3. The larval period varies from 9-28 days.
4. They pupate in cocoons among the fallen leaves, pupal period occupies 6-17 days.
5. There are 5 generations of the pest in a year.

Nature of damage

Caterpillars bore into petiole and mid rib of large leaves and tender shoots. In the later stage, it also bores into flower, buds and fruits. The flower buds shrivel due to attack. The inside of the fruit is damaged considerably and the entry hole can be sealed plugged with excrement.

Infested fruit becomes unfit for human consumption and marketing. Its infestation on brinjal can be as high as 70%.

Control Measure

Non-chemical Control-

- i) Brinjal plot should be clean from fallen leaves and debris.
- ii) Infested plant and shoot be removed from field.
- iii) Light trap should be used.

Chemical control-

- i) Spraying with **Diazinon/Dizinol 60 EC @ 680ml/ha.**
- ii) Spraying **Sumithion/Fentox/Edfen 50 EC @ 454ml/acre.**
- iii) Spraying with **Azodrin/Navacron/megaphose 40 WSC @ 454ml/acre.**

Lady's finger/Okra shoot and fruit borer

Scientific name: *Earias faabea*

Order: lepidoptera

Family: Noctuidae

Apart from the okra it also influences cotton and the insect pest is known as spotted bowl worm.

Life History:

1. The moths are small, female moth lays eggs singly on tender parts of the plants. A female lays about 385 eggs.
2. The incubation period is about 3 days.
3. Dark coloured caterpillar after hatching bores down the top shoots. The larvae becomes full grown in 10-12 days.
4. Pupal period to adult from 7-10 days. The pupate in a silken cocoons either on plants or on the ground among fallen leaves.
5. Total life cycle occupies 20-22 days and takes longer times in winter.

Nature of Disease

The caterpillar initially damages the tender shoot by boring into it which results in dropping on the shoots. The larvae let on bore into the fruits, young shoots, flowers and buds. The feeding causes severe shedding of early form of flowers bud. Its infestation on okra can be as high as 70%. Infested fruit become unfit for consumption and marketing.

Control Measures

Non-chemical Control-

- i) Okra plot should be clean from fallen leaves and debris.
- ii) Infested plant and shoot be removed from field.
- iii) Light trap should be used.

Chemical control-

- i) Spraying with **Diazinon/Dizinol 60 EC @ 680ml/ha.**
- ii) Spraying **Sumithion/Fentox/Edfen 50 EC @ 454ml/acre.**
- iii) Spraying with **Azodrin/Navacron/megaphose 40 WSC @ 454ml/acre.**

Bean Aphid

Scientific name: *Aphis craccivora*

A. fabae.

This is one of the commonest aphids found throughout the country infesting in varieties of plant. It is a vector of broad bean mosaic disease. It causes damage in 2 ways-

- i) **Directly**- through sucking the cell sap.
- ii) **Indirectly**- Carrying of disease/as a vector.

Life History

The life cycle of many aphids is more complicated and interesting. The most usual history of a migratory aphids is as follows-

1. Aphids lay eggs in autumn and winter gives rise to apterous, viviparous, parthenogenetic female in spring. This individual are known as fundatrices (the first usually wingless female of a season).
2. They produce parthenogenetically and viviparously is very large number throughout the summer.
3. In the autumn, wing insect are produced and they fly to another host plant, where the viviparous female give their offspring in normal way and the life cycle is repeated.
4. Winter is easily, usually passed in the eggs stage.

Nature of Damage

The nymphs and adults infest the tender shoot, inflorescence and tender fruits or pods in large number and suck the cell sap. In the early stage, the tender shoots will dryer. flower and tender pods fall of

pre-maturly.Tender pods may dry in severe causes.

Control Measures

Non-chemical control-

- Infested plant should be remove and burnt.
- Use ash on the plant.

Chemical control-

- Spraying with **Malathion/Zithiol/Maladon/Fyfanon 57 EC @ 454 ml/acre.**
- Spraying with **Sumithion/Fentox/Edfen 50 EC @ 454 ml/acre.**
- Spraying with **Roxin/perfecthion/Tafgor 40 EC @ 454ml/acre.**

Cut Worm

Scientific name: *Agrotis ipsilon*.

Order: Lepidoptera.

Family: Noctuidae.

The cut worm is a polyphagous insect and infest potato, tomato, cabbage, groundnut, bean and other vegetables seedlings.

Life History

1. Adult moth is white colour, A female lays about 300 eggs in several masses on the under side of the leaves of the host plant.
2. The incubation period 2-13 days depending on seasonal condition.
3. The dark brown larvae with red head becomes full grown in about a month.
4. Pupation takes place in soil in earthen chamber. Pupal stage lasts for complete in about 7-10 weeks.
5. There are 3 generation of the insect in a year.

Nature of Damage

The larvae become active during night.The stem of the younger plants are cut at a height of about 5 cm from ground level and in this way a large number of plants are damaged.This results is reduction in yield.

Control Measures

Non-chemical control-

- The clod of the field should be broken.
- The flooding of the infested field also control the pest.

- Plant residues and debris should be removed from the field.
- Clean cultivation should be practiced.

Chemical control-

- Application of **Heptachlor/Chlordane 40 WP @ 1.8 kg/acre** to the soil.
- The use of poison bait :-
 - a. Chlordane/Heptachlor 40 WP-3 pounds.
 - b. Wheat bran or rich husk- 100 pounds.
 - c. Molasses- 8-10 pounds.
 - d. Water as much required to make pest.

Mango Hopper.

1. *Idocerus alkinsoni*.

2. *I. niveosparus*.

3. *I. clypealis*.

Order: Hemiptera.

Family: Cicadellidae.

Nature of Damage

3 species of hopper causes serious damage to the inflorescence. Heavy laying on inflorescence causes dropping and withering of the fruits. Both nymphs and adults suck juice from the flowers, resulting in shedding and withering of the flowers. In case of severe attack, honey dew secreted by the hoppers over the inflorescence and leaves, giving rise to development of shooty mold which hinders the setting of fruits. Loss due to hoppers varies from 25-60%.

Life Cycle

1. The insect appears in large numbers during November to February as soon as the flower buds begin to form.
2. Females lay eggs on leaves, flower sticks and buds etc. Eggs are laid singly or in batches. A female lays on average 200 eggs.
3. The eggs hatch in 4-7 days in winter and 2-13 days in summer.
4. There are two generations of the pest from November to August.

Control Measures

- After harvesting of fruits, unnecessary branches should be removed.

- 2- spray are required.1st spray two weeks before flower and 2nd spray when mango assume the mango pie.
- Spraying **Ripcord/Symbush 10 EC/Desis 2.5 EC @ 250-300 ml in 252 litre water/acre.**
- Spraying **Raxion/Dithane M/Tafga 40 EC @ 454 ml in 225 litre water/acre.**

Mango Defoliator

Scientific name: *Cricula trifenstrata*.

Order: Lepidoptera.

Family: Saturniidae.

It is generally known as mango leaf cutting caterpillar causing defoliation.

Nature of damage

Caterpillar eat all parts of the leaves living only the mid ribs.partial or complete defoliation of the host plant occur.This hampers,the growth of the host plant and retards the formation of flower and hence of fruits life cycle.

Life History

1. Female moth lays egg in longitudinal rows along the dorsal margin of the leaves. A single female lays 89-253 eggs with an average of 83.
2. Egg hatch in 9 days and young caterpillar start feeding on leaves.
3. There are 5 larval instance. Total larvae last or stay 24-29 days. Mature and full feed caterpillar spin.
4. Its cocoon usually in cluster of leaves mid ribs and changes into pupa stages last for 2-3 days. pupal period last for 20-24 days.
5. Emergence of the adult from the cocoon is facilitated by the softening fluid applied by the moth to the anterior end of the cocoon.
6. Female moth are larger than male and dark brown in colour. Moth are nocturnal and feeds.
7. There are 5 generation of the pest in a year.

Control measures

Non-chemical control:

- Cocoon should be collected and burn or duct into the soil.
- Leaves containing egg mass or newly hatched larvae should be collected and destroy.

Chemical control:

- Spray with **nogos/aerovapona @ 400-500 ml with 225 L/acre.**

- Spraying with **Diazinon/sevin/dizinol 600 EC @ 680 ml/acre.**
- Spraying with **Sumithion/Edfen/Fentox 50 EC @ 454 ml/acre.**

Banana Leaf and Fruit beetle

Scientific name: *Notostoma viridipennis*.

Order: Coleoptera.

Family: Eumolpidae.

The pest causes best damage to Amritosagor banana and also Sabri and other varieties.

Nature of Damage

The beetle usually feed on the ventral part of the leaves. The green portion of the leaf are eaten up in irregular patches with the growth of the leaf are own's dried up resulting unhealthy grown up. When the young branches emergence from the developing spadhe, the beetles feeds on young fruits in irregular patches. With growth of the fruits, the small scars assume bigger shade proportionally. The scars fruit have a low market value.

Life Cycle

1. Female lays egg in masses of 50-60 margin of the leaf.
2. In the fold of the dried leaves, egg hatched in 5-9 days. The crubs feed on the root of banana plant.
3. After 3-4 weeks, they began to move down word and pupate in the soil near the surface.
4. Pupal period takes for 8-10 days. After emerge, beetle attack young leaves and fruit when it is available.

Control Measures

Non-chemical control

- Crop rotation is to bee followed.
- Banana garden should be kept clean.

Chemical control

- **Diazinon/Sevin/Dizinol 60 EC @ 300-400 ml** mixed with 225 litre of water/acre are sprayed.
- Spraying with **Sumithion/Fentox 50 EC @ 300-400 ml** in 225 litre of water/acre.
- **Carbaril 85 WP @ 300-400 g** with 225 litre of water/acre are sprayed. 2 spray on leaves at 15 days interval.

Citrus Caterpillar/Lemon Butterfly

Scientific name: *Papilio demolens*.

Order: Lepidoptera.

Family: Papilionidae.

It is a serious pest of all citrus plant especially lemon.

Nature of Damage

Caterpillar causes damage by feeding on leaves. Young caterpillar feed on young leaves and terminal shoots. They start feeding from the margin reached to mid rib. Sometime, the entire plant may defoliated. Heavily, infected plant bear no fruits.

Life Cycle

1. Female butterfly lays 75-120 eggs singly on the surface of the leaves and young shoots.
2. Egg hatched 3-4 days in summer and 5-8 days in winter.
3. Larval period 2-3 weeks.
4. Pupal period about 8-10 days.
5. There are 3-4 generation of pest in a year. They are found very much active in September.

Control Measures

- Collection of leaves containing eggs mass and nearly hatched caterpillar destroying it.
- Spraying with **Diazinon/Sevin/Dizinol @ 300-400 ml** in 225 litre of water.
- Spray with **Malathion/Maladon 57 EC @ 400-500 ml** in 225L water.

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